Key Largo Woodrat Recovery Action Plan

Key Largo woodrat (*Neotoma floridana smalli*)
U.S. Fish and Wildlife Service, Southeast Region – South Florida Ecological Services Field Office, August 14, 2009

◘**Target:** **Prevent extinction and promote species' stability and long-term persistence.**

Species Information:
Status: Endangered
Recovery Priority Number: 3C (high degree of threat/high recovery potential)
Recovery Plan: South Florida's Multi-species Recovery Plan, May 18, 1999
5-year Review: Completed in 2008
Other: Listed as endangered on August 31, 1984 (49 FR 34504); Key Largo Woodrat Captive Propagation Plan 2003

Threats:
Habitat loss and fragmentation: The only remaining large contiguous tract of tropical hardwood hammock vegetation occurs on the northern half of Key Largo. Approximately 880 hectares (ha) of the remaining 1,011 ha of tropical hardwood hammock are protected within the boundaries of Crocodile Lake National Wildlife Refuge (NWR) and Dagny Johnson Key Largo Hammock Botanical State Park (Service 2003). The Key Largo woodrat (KLWR) requires a minimum habitat size for daily activities; barriers caused by habitat loss and fragmentation compromise their ability to disperse, obtain food and nest site resources, locate a mate, and carry out natural

life history behaviors. The ease with which resources can be attained directly affects survival rates, fecundity, juvenile recruitment, and ultimately, population growth rate. Isolation of small populations also reduces or precludes gene flow between populations and can result in the loss of genetic diversity. As agriculture and urbanization has fragmented the landscape, the KLWR can no longer recolonize these areas as they did in the past. Populations may experience severe declines or extirpation, especially when coupled with events such as tropical storms, reduced food availability, and/or reduced reproductive success.

Limited availability of nest sites: Like eastern woodrats, KLWRs may be more limited by the availability of nest sites than by food. The lack of appropriate hammock trees or the energy cost and predation risk involved with construction may be affecting the woodrat's ability to build its large stick nests. While an estimated 20 percent of KLWR nests occur in fallen logs or root systems, free-standing stick nests appear to be absent from north Key Largo. Artificial substrate (rock and debris piles) and supplemental nest structures are readily used by KLWR, but their impact on the population is unknown.

Non-native predators: A large feral cat colony is located adjacent to the Dagny Johnson Key Largo Hammocks Botanical State Park. Non-native Burmese pythons *(Python molurus bivittatus)* have been captured in Key Largo since April 2007, and predation of KLWR by Burmese pythons was documented in 2007. Intra-agency partnerships have been developed to assess ecological risks, encourage responsible pet ownership, organize exotic pet amnesty days and media campaigns, and form a rapid response team. To specifically protect the KLWR, the FWS has funded a U.S. Geological Survey (USGS) project that includes a multi-faceted effort to detect and control Burmese pythons on Key Largo using visual surveys and several types of experimental traps to capture pythons.

Disease: Raccoons, while natural predators of KLWR, are attracted to areas with feral cat colonies due to regular feedings. This factor, in addition to the general attraction of raccoons to garbage, has likely led to elevated densities of raccoons in North Key Largo. Raccoon roundworm (*Baylisascaris procyonis*), the primary cause of the Allegheny woodrat's (*Neotoma magister*) decline, has not been reported in south Florida. Surveillance for the raccoon roundworm was initiated on Key Largo in 2002, and while the study was limited, there was no evidence that this parasite is present within the range of the KLWR. At this time, we consider this parasite to be a potential threat.

Restricted range: Historically, the KLWR occurred throughout the length of Key Largo south nearly to Tavernier in the Upper Keys. Their distribution is now patchy, congruous with the loss and fragmentation of hardwood hammock vegetation. The present range of the KLWR includes the northern one-third of Key Largo where large tracts of contiguous tropical hardwood hammock occur, representing about one-half of their original distribution. This species will likely be one of the first to feel effects of sea-level rise. This phenomenon may potentially result in the loss of suitable KLWR habitat through inundation or changes to vegetative composition. These effects have yet to be simulated and projected for the range of the KLWR.

Catastrophic events: Although some disturbance can serve to open habitat and allow for greater plant diversity, catastrophic events can cause extensive damage and habitat loss, possibly leading to extirpation or extinction. Damage to habitat from past hurricanes has included windshear, significant canopy loss, uprooting of large trees, understory damage, and significant soil disturbance.

Competitors: The presence of competitors, particularly non-native species, is a significant influence on habitat suitability. Trash dumping occurs throughout the KLWR's range and attracts human commensals. In the past, black rats (*Rattus rattus*) were captured at equal or greater numbers as KLWRs on hammock study sites and thought to be a serious competitor, but subsequent trapping sessions have yielded very few captures of black or Norway rats (*Rattus norvegicus*). Gambian giant pouch rats (*Cricetomys gambianus*) were unintentionally released in Marathon, Florida in 1999. Possible sightings on Key Largo have not been confirmed with trapping, but due to their large size, high fecundity, and similar food and nest site requirements, their impact on KLWR would be extensive. An eradication program initiated in Marathon appears to have been successful, though the pouch rats could emigrate by several means. Furthermore, the hurricanes of 2005 may have assisted in their dispersal to nearby islands.

Other natural or human factors: A recent and more extensive survey of KLWR genetics has demonstrated that KLWR do not exist as a single, panmictic (randomly mating) population. Instead, a spatially explicit model identified a series of genetic discontinuities (i.e., barriers to gene flow) across the subspecies' range resulting in five subpopulations.

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Current Status: While population trends are difficult to interpret from the various study designs and estimation techniques, surveys in the last 20 to 25 years suggest a declining population, currently at very low densities. A consistent monitoring technique conducted from 2007 to 2009 has indicated a declining population currently at approximately 100 to 300 individuals.
Target: Prevent extinction and promote species' stability and long-term persistence.

Measures: Increase population size and connect isolated populations. Improve Recovery Status from Declining to Stable.

Actions:

RA=Recovery Action; 1st # = priority; 2nd # = task.	**FY 09**	**FY 10**	**FY 11**	**FY12**	**FY 13**	**Costs (total)**	**Responsible Parties and Notes**
Revise KLWR Captive Propagation Plan RA: 1; s2.5		X	X			unknown (staff time)	FWS
Complete reintroduction of captive KLWR to Crocodile Lake NWR and monitor success. RA: 1; s2.4	X	X	X	X	X	$100,000 + needed	FWS, Florida Fish and Wildlife Conservation Commission (FWC), zoos, researcher, geneticist

RA=Recovery Action; 1st # = priority; 2nd # = task.	FY 09	FY 10	FY 11	FY12	FY 13	Costs (total)	Responsible Parties and Notes
Continue Burmese python control efforts on Key Largo. ($200,000 each year) RA: 1; s2.3.1, s5.2	X	X	X	X	X	$1,000,000	USGS
Investigate predator, competitor, and disease management strategies and/or more comprehensive control, if appropriate. RA: 1; s2.3.1, s5.2			X	X		$150,000	FWS, researchers, U.S. Department of Agriculture-Wildlife Services
Determine impact of artificial and supplemental nest structures on KLWR. RA: 3; h3.1		X	X	X		$200,000	FWS, FWC, KLWR researcher
Determine and update KLWR habitat use, habitat requirements, and habitat status. RA: 1-3; s1.4, s3.4, h3.1, h3.2, h4		X	X	X	X	$250,000	FWS, Florida Department of Environmental Protection (FDEP), researchers
Develop and implement an outreach / education program focused on the threats free-roaming cats and exotic pets pose to wildlife. RA: 3; s5.1, h5			X	X	X	$75,000	FWS, FDEP and /or a contractor

s = species-level recovery action; h = habitat-level recovery action

Role of other Agencies: The FWC may provide funding or staff support. The FDEP will play an important role as they own a portion of the public lands on which actions are planned.

Role of Other ESA Programs: Future section 7 consultations may provide opportunities to implement some actions on a small scale. Development of Habitat Conservation Plans through the section 10 process may be applicable for some projects.

Role of Other FWS Programs: Crocodile Lake NWR continues to provide financial support and occasional housing for researchers. Much of the work outlined in this plan will occur at Crocodile Lake NWR. The Coastal Program can help support habitat restoration and enhancement projects that may help conserve the species.

Additional funding analysis: Additional actions pursued if funding was available include: habitat restoration and enhancement projects, status surveys of KLWR on islands north of Key Largo, development of a substantial feral cat outreach/eradication program, improvement of the KLWR GIS database, forecasting the effects of sea-level rise and development of a contingency plan, and providing funding for a more extensive investigation of KLWR habitat use and status.

Revised Action Plan Due: August 2014